so in the modern use of ecology you are including man. . . ."

The upsetting thing about this dialogue is not the expression that "when it comes to a choice between ecology and people, ecology will have to go," but that a person in Mr. Livermore's position had to be reminded to refute it. To those of us like Professor Goldman** to whom ecology is simply a statement of the facts of nature, not a recent fashionable upsurge, this idea of a choice between ecology and people belongs in the same album of pious sentiments as the politician's statement that "you can't stop progress."

Goldman is right: The canary is dying and it is time we got out of the mine of resource exploitation before we join those defenseless birds who are now serving as our early warning system, the pelicans, cormorants, and falcons.

But it is obvious that still too many people, including public officials with the power to make irreversible changes in our environment, do not understand that the canary is dying (whether it happens to be a real bird or Lake Tahoe, in Professor Goldman's idiom), and seem to think that no matter what we do, man can somehow outlive ecology. As has been said of the businessmen for whom the magazine FORTUNE is intended, they think they "are in charge of progress." The editorial writer who proclaims in their behalf that we will continue to build power plants whether "environmental extremists" or "back-to-the-cave conservationists" like it or not is simply not with it. Whether David Brower or Dr. Edgar Wayburn likes these things or not is beside the point: all of us, or rather the children of all of us, will be in the same boat, for what we "environmentalists" are all trying to tell those who don't seem to want to listen (which sometimes includes even us chosen ones) is that there is a finite limit to the capacity of the earth to put up with any considerable population of our species, especially at its present level of resource use.

What Professor Goldman is saying in his polite, restrained manner, is that it is ecology, not us, that will decide whether we will survive on earth, and that our activities are closing out our options. Certainly our time will be shortened even more if political and private concerns do not "rally to the cause and make every effort to preserve our diminishing natural resources."

**Goldman CR: Is the canary dying? The time has come for man, miner of the world's resources, to surface. Calif Med 113:21-66, Nov 1970

If We Hurry We May Be Late

SUMNER M. KALMAN, M.D., *Stanford**

IN "THE NEW AIRBORNE DISEASE" Dr. John Goldsmith** has described the composition and nature of smogs and what is known about their effects on health. This is an elegant and scholarly review. I want to develop one comment that Goldsmith made, because I think it is central to a rational attack upon problems that attend pollution. He said the only "long-term" solution lies in mass transportation. Study the symptoms, record the signs, but above all let's attack the disease.

Let me be blunt. There are others to talk about the spaceship analogy and the great challenges to American Medicine. I think we are in danger of being conned out of the really big game, which is a redirection of effort rather than today's rearguard action, picking up beer cans and praying for a new smog control device.

Even if magnificent smog control devices and beautiful fuels are forthcoming the land will be eaten up. In my county the growth of road mileage outstrips the population growth, more than a doubling in a ten-year period. In Marin County the increase is greater. The traffic gets heavier, the noise increases, and prime land goes for parking lots and garages. After the expenditure of about half a billion dollars for smog control devices in California it became irritatingly clear that nitrogen dioxide levels were higher and persisted longer—because we had removed the hydrocarbons which ordinarily react with and reduce nitrogen dioxide. I have no doubt that we can solve these problems of chemical engineering, but I doubt that we can stop the proliferation of automobiles soon enough to save the land. I assert, but I cannot prove, that open space and trees and meadows are critically important for the health of man.

*Professor of Pharmacology, Stanford University School of Medicine.

**Goldsmith JR: The new airborne disease—Community air pollution. Calif Med 113:13-20, Nov 1970

But why do I have to prove it? Why can't the burden of proof be placed on those who are not mindful of the landscape? Why should not the highway builders and their sponsors be made to demonstrate that their efforts contribute more to human welfare than do the lands they take away? Why should they continue to build successively larger patterns of concrete with no apparent responsibility to plough up the lesser roads we had before? At peak hours on the Bayshore Highway near my home, autos use about 5 percent of the capacity of the road. And we build more of these. We need public transportation desperately. This is the crucial issue.

Let me give another example. The great manufacturers of cans are delighted to discover how popular their containers have become. How cheap it is to get the metals back! I wasn't trained for this. Even the instructions for salvage seem somehow abrasive to me. Whose time is used to crush or clean out and segregate containers of different types? Can money ever really compensate for this strange new use for time? Perhaps merit badges for container recognition and bottle washing can replace those for woodcraft. We must tax these throwaway items out of existence.

There is a single thread in this terse statement. Let's fight the big fights. We can be flattered into a career of cosmetic surgery or we can opt for redirection.

On "Chemicals in the Environment"

R. HEWLETT LEE, M.D., *Palo Alto**

THE MASSIVE environmental dosage of chemicals we are now receiving, continues blithely along in the face of the most incredibly incriminating ecologic evidence of long range toxicity affecting every order of living species. Dr. Rudd** has beautifully presented the problem of the progressive chemical pollution of our world at the hands of industrial man and the call for action is clear.

Annually, we deposit the equivalent of 220 pounds of synthetic organic pesticides on every square mile of the U.S.A. DDT and related chlorinated hydrocarbons (nondegradable) sprayed or dusted on the land, wash in the streams, lakes and ultimately the ocean. Insoluble in water and highly soluble in fats and oils, DDT and relatives are rapidly absorbed into algae and plankton and here the disaster begins. At levels of a few parts per million (ppm) plankton photosynthesis is halted and the world's oxygen supply could be threatened if ocean levels reach these critical amounts. Tiny fish and shellfish consume the plankton, and concentrate the DDT and like compounds in their fats. Larger fish feed upon the smaller ones and so on up the line, progressive concentration of the chemicals occurring. Birds, mammals and man eat the fish and are receiving ever greater dosages of these compounds. The devastating effects on reproduction of lesser animals is measurable. Shellfish transmitting DDT residues greater than 0.5 parts per million to their eggs, kill the larvae, which could explain the decline of shellfish in our coastal waterways. At 2.9 ppm salmon are unable to acclimatize and at 20 ppm, fingerling trout and salmon die. (Striped bass from our Sacramento River Delta have DDT levels as high as 119 ppm and the famed Lake Michigan Coho salmon are banned for interstate sale because of concentration of 20 ppm.) In birds, DDT apparently stimulates the liver to make an enzyme-destroying estradiol which regulates calcium metabolism and thus they lay insufficiently calcified eggs and now whole species of fish-eating birds, including the much publicized brown pelicans on Anacapa Island, are faced with total reproductive failure and extinction. The toxic effect of smaller concentrations on man is as yet undetermined. Higher concentrations are associated with encephalomalacia, hepatitis and cirrhosis, and in experimental animals carcinomatosis occurs in subsequent generations.

In the face of these terrible occurrences on our entire ecosystem, it is urgent that we, as physicians, actively support legislation which requires elimination of these nondegradable compounds

*Department of Surgery, Palo Alto Medical Clinic and Stanford University School of Medicine; Consultant, CMA Committee on Environmental Health.

**Rudd RL: Chemicals in the environment. Calif Med 113:27-32, Nov 1970